



Species Management Plan
Sulfur Cinquefoil
Potentilla recta L.

Life History/ Identification:

Sulfur cinquefoil is a member of the rose family, Rosaceae and is native to the eastern Mediterranean region of Eurasia. It was first reported in North America in Canada around 1900 and has spread to many parts of the United States and Canada (Sheley and Petroff). Sulfur cinquefoil is a perennial

plant, which grows to a height of 1 to 1½ feet. It has a well-developed underground root system and a woody caudex. The leaves are palmately compound with 5 to 7 leaflets. The leaflets have toothed edges and are slightly hairy. A distinguishing feature that separates sulfur cinquefoil from other cinquefoil species is the greenish appearance of the undersides of the leaves. In most cinquefoil species the undersides of the leaves have a silvery appearance. The flowers of sulfur cinquefoil are light yellow and have the typical five petal rose configuration. Regeneration of the plants is mostly from seeds. However mature plants can reproduce vegetatively. Each year new shoots form along the edges of the woody caudex. Over a period of several years the center of the caudex dies, leaving a group of individual plants growing in a close group. Sulfur cinquefoil is very competitive, but does not seem to tolerate shade well. Improper identification of sulfur cinquefoil in the Northwest may have contributed to its spread. Suspected populations of sulfur cinquefoil should be properly identified before extermination begins. There are several native species of *Potentilla* in Northern Arizona. Improper identification could lead to extermination of native species, which would be ecologically unsound, and waste valuable resources needed for control of noxious weeds. Sulfur cinquefoil might also be confused with marijuana in the vegetative stage (Sheley and Petroff).

Status: Sulfur cinquefoil is included on the list of Noxious Weeds and Species of Special Concern maintained by the Southwest Exotic Plant Mapping Program but the species is not included on the Noxious Weed List for the Coconino, Kaibab and Prescott National Forests. The species is not included on the Arizona State Noxious Weed List.

Known Locations: There have been reports of this species in the Rio de Flag area on the Coconino National Forest. No locations were found in the SWEMP database. Additional locations for this species may exist in Northern Arizona. The species may have been mistakenly identified as a native species.

Impacts: Sulfur cinquefoil is highly competitive. Its competitive ability combined with misidentification has led to its rapid spread in some parts of the country. Sulfur cinquefoil can occupy a wide variety of habitats and can compete successfully with plants such as yellow starthistle. Sulfur cinquefoil can become a dominant member of the plant community. Most grazing animals will avoid eating sulfur cinquefoil due to the presence of high levels of tannin.

Control:

1. Cultural Control:

Proper identification of this species may be the first step in determining the presence and extent of infestations in Northern Arizona. References such as *Weeds of the West* or *Biology and Management of Noxious Weeds* are good references to consult. References on local flora such as *Seed Plants of Northern Arizona* provide keys for identification of the locally known species of cinquefoil. However, if a reference such as *Seed Plants* is used, the specimen should also be taken to a herbarium for comparison with known specimens. It is possible to use a dichotomous key and get the wrong identification because the choices are limited to the species listed in the key. Deaver Herbarium at Northern Arizona University is open to the public for use. Botanists are available to assist you in verification.

Sulfur cinquefoil spreads primarily from seed. Therefore, activities that transport seed from infested areas could be sources of infestation. Vehicles coming from areas of infestation could be sources of new introductions. **Cleaning** vehicles, including tires should be encouraged. **Seed mixes** could be a source of infestation if they are coming from areas where this species is established. Since this species is not currently on the state or forest lists, obtaining certified seed is no guarantee that it will not contain seeds of sulfur cinquefoil. Seed purchasers should review the weed lists of the state origin to see if sulfur cinquefoil is controlled and should ask about the growing conditions of the seed. Sulfur cinquefoil seeds remain viable in the soil for up to three years. Therefore, prevention of the introduction of seeds is very important.

Road machinery working near infestations of sulfur cinquefoil should be encouraged to avoid the populations and should be cleaned before leaving the site. Activities such as blading could spread both seeds and roots of the plants.

Overgrazing can contribute to the expansion of populations in areas where sulfur cinquefoil exists. Overgrazing reduces competition from native grasses and allows sulfur cinquefoil populations to expand more quickly. Reduction of plant competition and the unpalatability of sulfur cinquefoil in combination favor population expansion in most grazing systems. Prudent range practices and regular utilization monitoring will reduce this risk. **Goats** are the only animals known to select for sulfur cinquefoil (Sheley and Petroff).

2. Mechanical Control

Regular **tilling** reduces the risk of establishment of this species in agricultural fields. However, this method could not be applied on most lands administered by the Coconino, Kaibab and Prescott National Forests. Consideration of other resources such as rare plants and archaeological resources generally prevent extensive tilling.

Mowing is not an effective control for sulfur cinquefoil. Regular mowing will cause the plants to form dense, bulky roots.

Hand pulling or **hand digging** can be effective in controlling small populations, especially if the populations are recently established. The populations should be **revisited** and **monitored** periodically to ensure that they have not regenerated from propagules.

The effects of **fire** on sulfur cinquefoil are unknown. Buried seeds and roots would probably survive fire depending on the intensity. Reduction of competition from other species through the removal by fire could possibly contribute to the spread of sulfur cinquefoil populations.

3. Chemical Control: *Noted here are chemical control techniques in use in other areas. Always check with weed specialists or chemical suppliers to ensure correct dosage and application. Mention of these products does not imply endorsement by the Northern Arizona Weed Council, San Francisco Peaks Weed Management Area, the USDA Forest Service, nor the Nature Conservancy. Currently the use of herbicides is not allowed on lands administered by the Coconino, Kaibab and Prescott National Forests. Always check with your local land manager before using herbicides on public lands.*

Picloram can be used to control sulfur cinquefoil if applied in the fall or spring prior to late bud stage. The recommended rate of application is 0.25 lb. acid equivalent per acre

Spring application of **2,4-D Ester**, on the rosette through bud stage is effective. The application rate is 2 lbs. ae/acre.

Tordon can also be used in the bud or rosette stage.

Herbicide treatment reduces the population, but seedlings can reappear for up to four years. This is probably due in part viability of seeds in the soil.

4. Biological Control:

There are **no biological control agents approved** for use on sulfur cinquefoil by the Animal and Plant Inspection Service.

Most known potential agents that have been found in the United States cannot be used due to potential attacks on other species which are either native or valuable on a commercial basis. There are several insects and diseases associated with sulfur cinquefoil in the eastern U.S. However, many of these attack other species such as

strawberries, which are genetically and physiologically similar to sulfur cinquefoil. Several species of root and crown boring insects associated with sulfur cinquefoil have been found on the Northwest. However, these insects also attack strawberries. The State of Montana has funded a search for biological control insects in Eastern Europe. However, any potential agents will need to be tested before release, and that could take several years (Sheley and Petroff).

5. Integrated Control:

The use of **fertilizer** following the application of herbicide can help favor competing species such as native grasses. However, the use of fertilizer alone can only lead to an increase in the population of sulfur cinquefoil.

References:

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